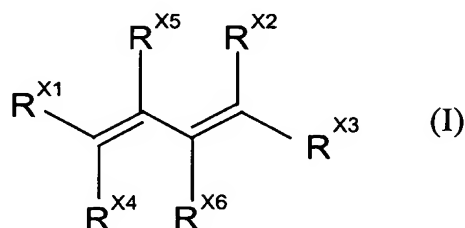


Claims:

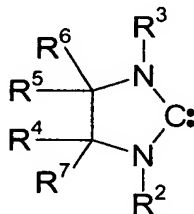
1. A process for the catalytic telomerization of acyclic olefins having at least two conjugated double bonds (I)

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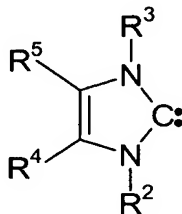


with at least one nucleophile,

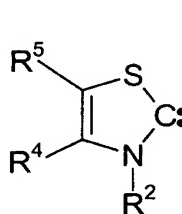
- 10 wherein complexes comprising metals of groups 8 to 10 of the Periodic Table of the Elements and at least one carbene ligand having one of the formulae



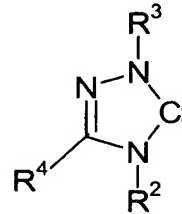
(III)



(IV)



(V)



(VI)

where

- 15  $R^{X1}, R^{X2}, R^{X3}, R^{X4}, R^{X5}, R^{X6}$  are identical or different and are each H or a linear, branched, substituted or unsubstituted cyclic or alicyclic aliphatic or aromatic group having from 1 to 24 carbon atoms,

$R^2, R^3$ : are identical or different and are each a) a linear, branched, substituted or unsubstituted cyclic or alicyclic alkyl group having from 1 to 24 carbon atoms,  
or b) a substituted or unsubstituted, monocyclic or polycyclic aryl group having from 6 to 24 carbon atoms

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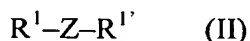
or c) a monocyclic or polycyclic, substituted or unsubstituted heterocycle having from 4 to 24 carbon atoms and at least one heteroatom from the group consisting of N, O, S,

5         $R^4, R^5, R^6, R^7$ : are identical or different and are each  
hydrogen, alkyl, aryl, heteroaryl, -CN, -COOH, -COO-alkyl, -COO-aryl,  
-OCO-alkyl, -OCO-aryl, -OCOO-alkyl, -OCOO-aryl, -CHO, -CO-alkyl,  
-CO-aryl, -O-alkyl, -O-aryl, -NH<sub>2</sub>, -NH(alkyl), -N(alkyl)<sub>2</sub>, -NH(aryl),  
-N(aryl)<sub>2</sub>, -F, -Cl, -Br, -I, -OH, -CF<sub>3</sub>, -NO<sub>2</sub>, -ferrocenyl, -SO<sub>3</sub>H, -PO<sub>3</sub>H<sub>2</sub>,  
10        where the alkyl groups have 1-24 carbon atoms and the aryl groups have  
from 5 to 24 carbon atoms and the radicals  $R^4$  and  $R^5$  may also be part of  
a bridging aliphatic or aromatic ring,  
with the proviso that when the metal of groups 8 to 10 of the Periodic Table is Pd,  $R^2$   
and/or  $R^3$  have the meaning c), are used as catalyst.

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2.        The process as claimed in claim 1, wherein  $R^2, R^3, R^4, R^5, R^6$  and  $R^7$  are identical or  
different and have at least one substituent from the group consisting of -H, -CN,  
-COOH, -COO-alkyl, -COO-aryl, -OCO-alkyl, -OCO-aryl, -OCOO-alkyl, -OCOO-aryl,  
-CHO, -CO-alkyl, -CO-aryl, -aryl, -alkyl, -alkenyl, -allyl, -O-alkyl, -O-aryl, -NH<sub>2</sub>,  
20        -NH(alkyl), -N(alkyl)<sub>2</sub>, -NH(aryl), -N(aryl)<sub>2</sub>, -F, -Cl, -Br, -I, -OH, -CF<sub>3</sub>, -NO<sub>2</sub>,  
-ferrocenyl, -SO<sub>3</sub>H, -PO<sub>3</sub>H<sub>2</sub>, where the alkyl groups have from 1 to 24, the alkenyl  
groups have from 2 to 24 carbon atoms, the allyl groups have from 3 to 24 carbon atoms  
and the aryl groups have from 5 to 24 carbon atoms.

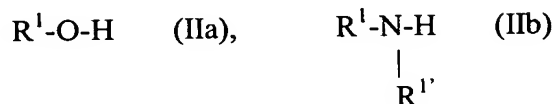
25        3.        The process as claimed in claim 1 or 2, wherein a nucleophile of the formula (II)



where Z is O, N( $R^{I''}$ ), S(O<sub>2</sub>), Si( $R^{I''}$ )(OH), C=O, C(H<sub>2</sub>), C(H)(NO<sub>2</sub>) or  
30        N(CH<sub>2</sub>CH=CH<sub>2</sub>) and  $R^I, R^{I'}$  or  $R^{I''}$  are identical or different and are each H, a  
substituted or unsubstituted, linear, branched or cyclic alkyl or alkenyl group having  
from 1 to 22 carbon atoms, a carboxyl group or an aryl group, where the radicals  $R^I, R^{I'}$

may be joined to one another via covalent bonds and  $R^1$  and  $R^{1'}$  may bear identical or different substituents.

4. The process as claimed in at least one of claims 1 to 3, wherein compounds of the formula (IIa) or (IIb)



where  $R^1$ ,  $R^{1'}$  are identical or different and are each H, a substituted or unsubstituted, linear, branched or cyclic alkyl or alkenyl group having from 1 to 22 carbon atoms, a carboxyl group or an aryl group and the radicals  $R^1$ ,  $R^{1'}$  may be joined to one another via covalent bonds, are used as nucleophile.

5. The process as claimed in any of claims 1 to 4, wherein water, alcohols, phenols, polyols, carboxylic acids, ammonia and/or primary or secondary amines are used as nucleophiles.

6. The process as claimed in any of claims 1 to 5, wherein 1,3-butadiene or isoprene is used as acyclic olefin (I).

7. The process as claimed in any of claims 1 to 6, wherein 1,3-butadiene in admixture with other  $C_3$ -,  $C_4$ - and/or  $C_5$ -hydrocarbons is used as acyclic olefin (I).

8. The process as claimed in any of claims 1 to 7 carried out in a solvent, where the nucleophile (II) and/or inert organic solvents is/are used as solvent.

9. The process as claimed in any of claims 1 to 8, wherein the ratio of carbene ligand to metal [mol/mol] is from 0.01:1 to 250:1.